

R E M A R K S

Claim 1 has been amended by including therein the subject matter of claim 5 and claim 5 has been canceled.

Also, claim 11 has been amended by including therein the subject matter of claim 15 and claim 15 has been canceled – that is no matter has been included in the claims which would require an additional search.

The Examiner has rejected claims 1 – 5 under 35 USC 102(b) as being anticipated by Linder et al. (5 649 282), she has rejected claims 1 – 5, 7, 11-15 and 17 under 35 USC 102(b) as being anticipated by Drumheller (US 5 914 182) and she has rejected claims 6, 8, 9, 10, 16, 18, 19 and 20 under 35 USC 103(a) as being unpatentable over Drumheller (US 5 914 182).

In view of the Examiner's arguments, in order to avoid any misunderstanding, it appears to be expedient to define in the independent claims 1 and 11 that the polyimide body is covalently functionalized directly by a chemical group with which it has been contacted. No coating takes place. That means the basic body directly is functionalized – no compound or membrane is disposed on the body and no amino-containing coating is applied to the body. This feature, that is that the body or substrate is directly functionalized is covered by, and part of, the whole description. The base structure of the polyimide body is described throughout the specification and in all examples as being functionalized directly with a chemical group by contacting the polyimide body with an aqueous modifier solution. “Directly” has been added to the claims 1 and 11 to make it even clearer, that is, absolutely clear, that the functionalizing is performed without intermediate steps and without intermediate layers which may be functionalized instead of the body itself.

Concerning the Examiner's point 1, it is noted that, for the washing step, it is unimportant in which way the modifier substances are or have been co-valently bound to the polymer. It is well known that a co-valent bond is stronger than other bonds. Therefore during washing of the membrane or body, weakly bound, that is not covalently bound, substances are flushed out. Strongly, that is covalently bound, substances remain on the body. Therefore for the washing procedure, it is not important how a co-valent bond is formed.

Since neither Linder et al. nor Drumheller et al. discloses a direct functionalizing of the base structure of a polyimide body, but only layer structures, claim 1 and claim 11 as amended are clearly novel and they are not obvious from these references either since neither of the references discloses, or suggests, such a procedure or such a body.

With the above comments, also the arguments of the Examiner concerning point 7 of the Official Action should be moot since it has been made clear that a covalent link between the chemical group and the polyimide body is established directly without any intermediate structure. It is noted that this point should always have been clear since all the examples disclose the direct co-valent linking between the chemical group and the polyimide body so that there was no reason to assume otherwise. This is a fundamental difference as the polyimide body is directly modified in its base structure wherein there is no need for the provision of layer structures as provided by Drumheller and Linder.

It is known already from the Abstract of Drumheller that this patent is concerned with a multilayer application of different substances: A base body is coated with a surface-active substance and adheres on the usually hydrophobic membrane (physiosorption column 8) and is cross-linked thereon. A surface is generated thereby which is then coated with a hydrophilic substance or, respectively, covalently linked thereto. Strangely enough, also polyethylenimine is mentioned as surface-active substance; but it is also disclosed how this all occurs and what this substance must be capable of (column 12) that is at least one component of this substance: permit physisorption, needs to include groups which make a chemical modification possible with suitable agent and groups which are capable of interacting with high surface tension fluids.

It is said in column 13 that this first layer is covalently cross-linked to itself using a suitable cross-linking agent. Those cross-linking agents are listed in column 13. It is logical that the cross-links are formed by covalent interlinks of the layer of the coating polymer with itself if the interlinker spectrum is considered. It is however quite apparent that, in no case, the links are based on a direct covalent linking of the substance of the first coating to the polymer substrate.

The inventor has submitted some of his publications from which the principle on which the present invention is based should become clearer. It is pointed out however, that,

in the Drumheller patent, the polymer substrate (if it comprises polyimides) is not covalently linked with the hydrophilic substance layer (if this is a polyethylenimine).

It is true that the coating conditions such as concentration, temperature and residence times mentioned in the two patents are overlapping. And it is also true that in accordance with Drumheller any porous body may be used as polymer substrate.

The difference however resides in the way the coating is established on the substrate by co-valent functionalization of the body, that is that, in accordance with the present invention the "coating" is formed directly within the substrate or body, and it is also not established by the functionalization of a coating applied to the substrate or body.

Finally, concerning the wetting of the membrane, it is true that this is described in the Drumheller patent. There however, this is necessary in order to be able to coat a hydrophobic polymer body relatively uniformly with a hydrophilic polymer solution. In the present case, it would therefore probably be more appropriate to speak of a pore-filling agent since, in accordance with the principle of the present invention, in this way the spontaneous penetration of the coating component should be prevented since, in a porous body, after filling of the pore system of the porous body, this is only possible by diffusion and, as a result, facilitates an asymmetric functionalization.

However, the Examiners allegation that claims 10 and 20 of the present application which concern the wetting of the membrane with a well wetting aqueous solution is disclosed by Drumheller (col. 13) is contradicted. The Examiner cites here from a process stage where the membrane is already coated that is a stage in the membrane manufacture which does not exist in the present application.

Concerning the Linder patent, it is noted that this has been commented extensively in Applicants last response (11/11/06): The Linder patent requires modifiers with primary amino groups which are diazotized and then generate covalent links. But this is a completely different chemistry and results in markedly different membranes. This should become apparent to the Examiner from a study of Applicants publications which are enclosed herewith.

Since the subject matter of claim 5 has now been included in claim 1 and the subject matter of claim 15 has been included in claim 11, the invention is now defined in even greater detail and in a distinct manner. It should now also be clear to the Examiner that the polyimide body is covalently functionalized directly by a chemical group with which it has

been contacted. No coating takes place. That means the basic body is directly functionalized – no compound or membrane is disposed on the body and no amino-containing coating is applied to the body and functionalized. And this is not disclosed in, nor in any way suggested by, the prior art.

Reconsideration of claims 1 and 11 is respectfully requested.

Claims 2 to 4, 6 to 10 and claims 12 to 14 and 16 to 20 define features which are considered to be advantageous in connection with the subject matter as defined in claims 1 and 11, respectively.

Reconsideration also of the dependent claims is respectfully requested and allowance of claims 1 – 4, 6 – 14 and 16 – 20 is solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "K. Bach", with a long, sweeping horizontal stroke extending to the right.

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